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Northeastern Pacific Albacore Survey
Part 1. Biological Observations

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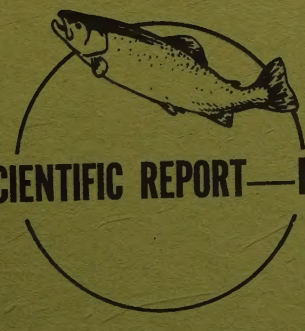

SPECIAL SCIENTIFIC REPORT—FISHERIES NO. 310

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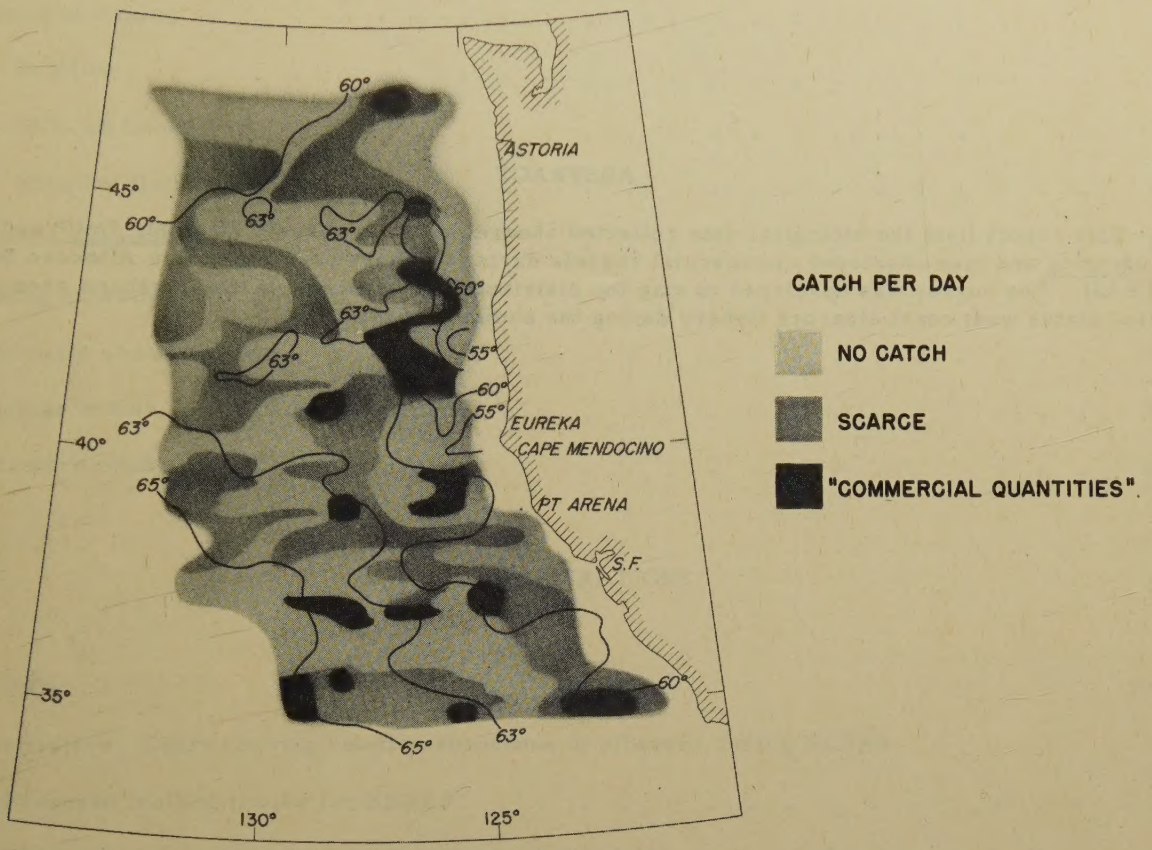

NORTHEASTERN PACIFIC ALBACORE SURVEY

PART 1. BIOLOGICAL OBSERVATIONS

By

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ABSTRACT

This report lists the biological data collected aboard research vessels Hugh M. Smith and John R. Manning and nine chartered commercial vessels during the Northeastern Pacific Albacore Survey (NEPAS). The survey was developed to map the distribution of albacore in the northern area of the United States west coast albacore fishery during the summer of 1957.

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PART 1. BIOLOGICAL OBSERVATIONS

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Albacore tuna, Germo alalunga (Bonnaterre) were landed commercially in ports of Washington and Oregon for the first time in 1937. During 1939 they began to appear in exploratory catches of commercial vessels off British Columbia, Canada. By 1945 the annual commercial catch exceeded a million pounds. Large catches were consistently made off British Columbia by 1948 with good fishing extending as far north as Queen Charlotte Islands (Powell et al. 1952), which represented the farthest northward extension of the fishery. Following 1948 the fishery declined rapidly; by 1951 only a few albacore were taken commercially north of California.

The return of albacore to these northern waters was indicated in 1955 when scattered fish were reported from the area by research vessels of the University of Washington and of the United States Fish and Wildlife Service (Graham 1957, Holmberg 1955). In 1956, vessels from these agencies again reported fish in the area and commercial vessels, which followed up these reports, developed a small albacore fishery off Oregon (Anonymous 1956, Frolander and Lincoln 1956).

The Northeastern Pacific Albacore Survey or NEPAS was designed to map the distribution of albacore in this northern area and to determine how the distribution was related to oceanographic and biological phenomena. The survey was conducted by the Biological Laboratory of the Bureau of Commercial Fisheries at Honolulu, Hawaii, as a part of their Saltonstall-Kennedy (68 Stat. 376) albacore tuna project, and in cooperation with members of the fishing industry, and the fishery research agencies of California, Oregon, and Washington. The Pacific Marine Fisheries Commission acted as liaison for the cooperating agencies.

The survey area extended from 35°N. to 47°N. latitude and from 50 to 350 miles offshore. The southern limit of the survey area was just north of Point Arguello, California, which approximates the northern summer limit of the southern California albacore fishery. The northern limit approached generally the northernmost penetration of the west coast albacore fishery during the summer. Inshore and offshore limits were determined from data gathered on previous cruises which indicated that a definite scarcity of fish existed beyond these boundaries during the summer (Graham 1957, Anonymous 1957). Thus, the survey was placed off the coasts of northern California, Oregon, and Washington. The period covered was from July 22 to August 1 (1957), a time when the west coast albacore fishery could be expected to reach or approach its peak in production (Clemens 1955).

Nine charter vessels were assigned to the trolling tracks shown in figure 1. Six of the vessels carried scientific observers provided by California Fish and Game (2), Oregon Fish Commission (1), Washington State Department of Fisheries (1), and Honolulu Biological Laboratory (2). The vessels, operators, home ports, and names and agencies of the observers are given in table 1. The charter vessels were augmented by the two Honolulu Laboratory vessels, the Hugh M. Smith and the John R. Manning, which operated in the survey area making oceanographic and biological observations.

This report lists the biological data collected during the survey. They are presented here to make them readily available to other agencies studying the ecology of the albacore in the eastern Pacific. Descriptive and analytical publications will follow. Oceanographic and plankton data will also be the subjects of separate reports.

The John R. Manning departed on cruise 36 from Honolulu on June 14, 1957, to make a preliminary troll and gill-net survey of the area. The Manning travelled northeast to 42°N., 135°W. (see fig. 2), returned south to 31°N., and then zigzagged northward through the NEPAS area. The Manning arrived in Astoria, Oregon, on July 16 and remained there until the start of NEPAS on July 22. Subsequently, she proceeded

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[1/] Formerly the Pacific Oceanic Fishery Investigations.

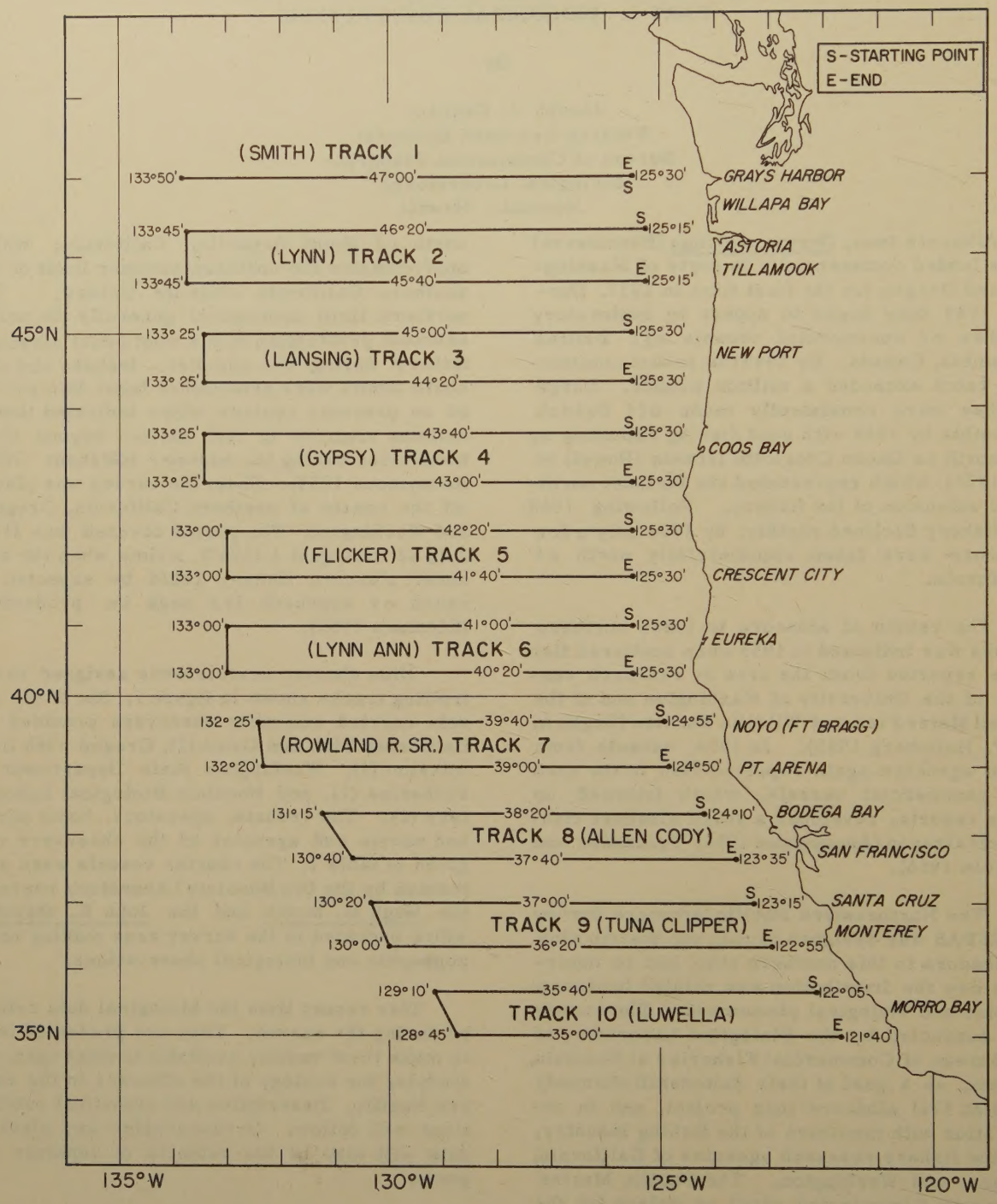

Figure 1.--Proposed trolling tracks for NEPAS and the names of the vessels assigned.

south through the NEPAS area, transferring equipment to the charter vessels, and then crossed into and out of the coastal band of cold water, and checked areas where the charter vessels reported good catches. The Manning returned to Honolulu August 20, 1957.

The Hugh M. Smith departed from Honolulu on cruise 40 on July 1, 1957, to run a line of oceanographic stations between Oahu and 38°35'N., 143°28'W. (see fig. 3). The Smith then conducted an oceanographic and trolling survey between 40°N. and 46°N. and arrived

Table 1.--NEPAS charter vessel data

Name	Owner[1/]	Home port	Scientific observer aboard	Organization
Allen Cody	Hunter and Foland (L. L. Newton, operator)	Fields Landing, California	Howard O. Yoshida	Honolulu Biological Laboratory
Flicker	Gus Wagner	Newport, Oregon	George Miller	Oregon Fish Commission
Gypsy	Jim Lyons	Seattle, Washington	William Stickley	Washington Department of Fisheries
Lancing	Oscar Knudsen	Seattle, Washington	None	-
Lynn	Les Withee (Josh Bufton, operator)	Garibaldi, Oregon	None	-
Lynn Ann	Herman Foland	Fields Landing, California	Thomas S. Hida	Honolulu Biological Laboratory
Luwella	O. James Bardeau	San Diego, California	Tom Jow	California Department of Fish and Game
Rowland R. Sr.	William R. Roland	El Cerrito, California	None	-
Tuna Clipper	Erling Kolnes (Floyd M. Rhoades, operator)	San Pedro, California	Robert L. Caldwell	California Department of Fish and Game

[1/] Except where operators are indicated, vessels were operated by the owners.

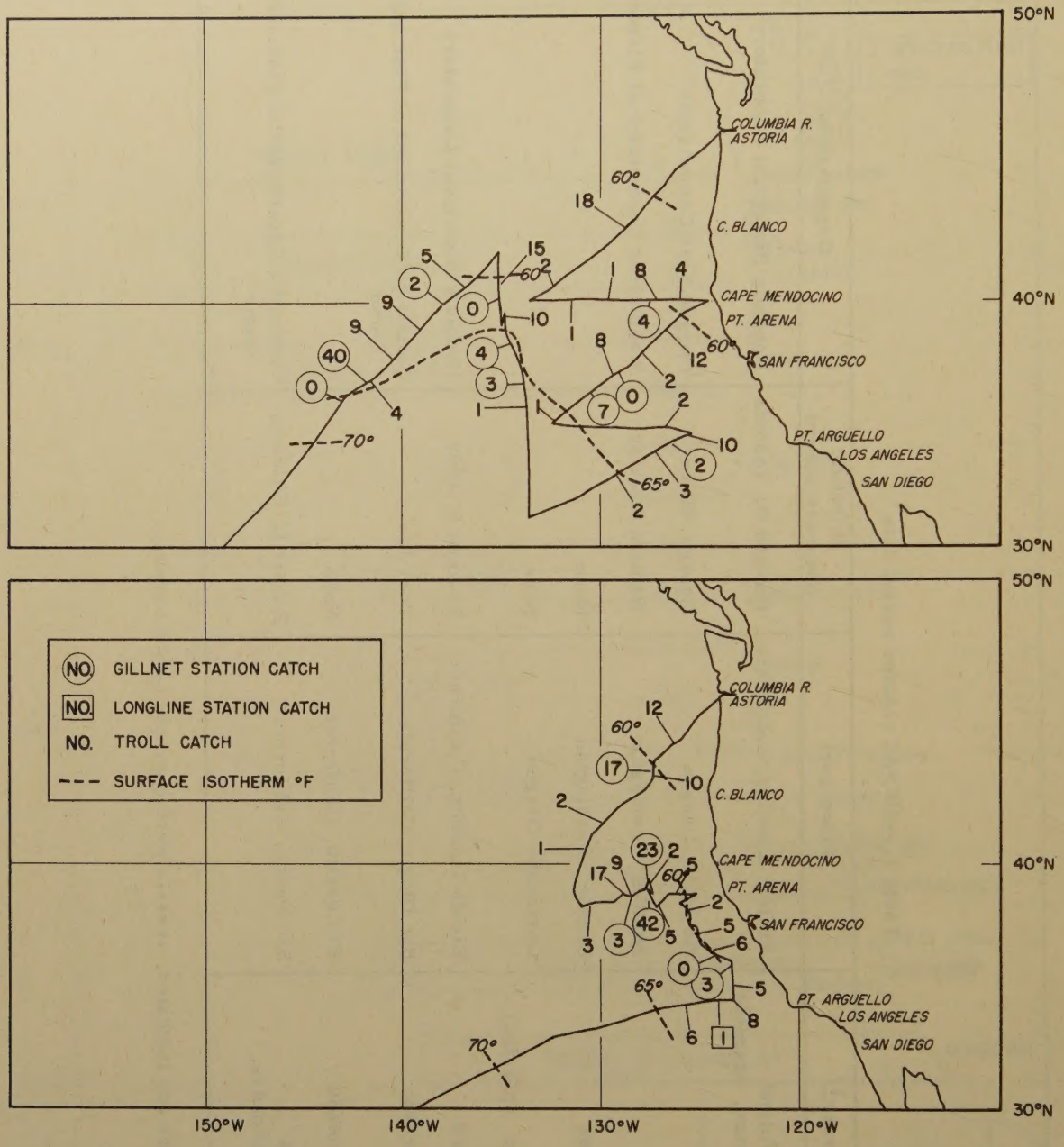

Figure 2.--Albacore tuna catches made with trolling gear, gill nets, and longline by the John R. Manning (cruise 36) during the Northeastern Pacific Albacore Survey. Upper panel shows catches on track outbound from Honolulu and lower panel shows catches on track outbound from Astoria, Oregon.

in Astoria, Oregon, on July 18. During the period July 22 to August 15, the Smith acted as coordinating vessel for the NEPAS survey, completed the northernmost trolling track of NEPAS, conducted an oceanographic and trolling survey of the NEPAS area, and adjusted her track to cover areas which had been assigned to vessels forced to withdraw from the survey. After a stop for repairs at Oakland, California, from August 15-26, 1957, the Smith completed the oceanographic and trolling survey of the NEPAS area and departed for Honolulu on August 29, again occupying a line of oceanographic stations en route. She returned to Honolulu on September 5, 1957.

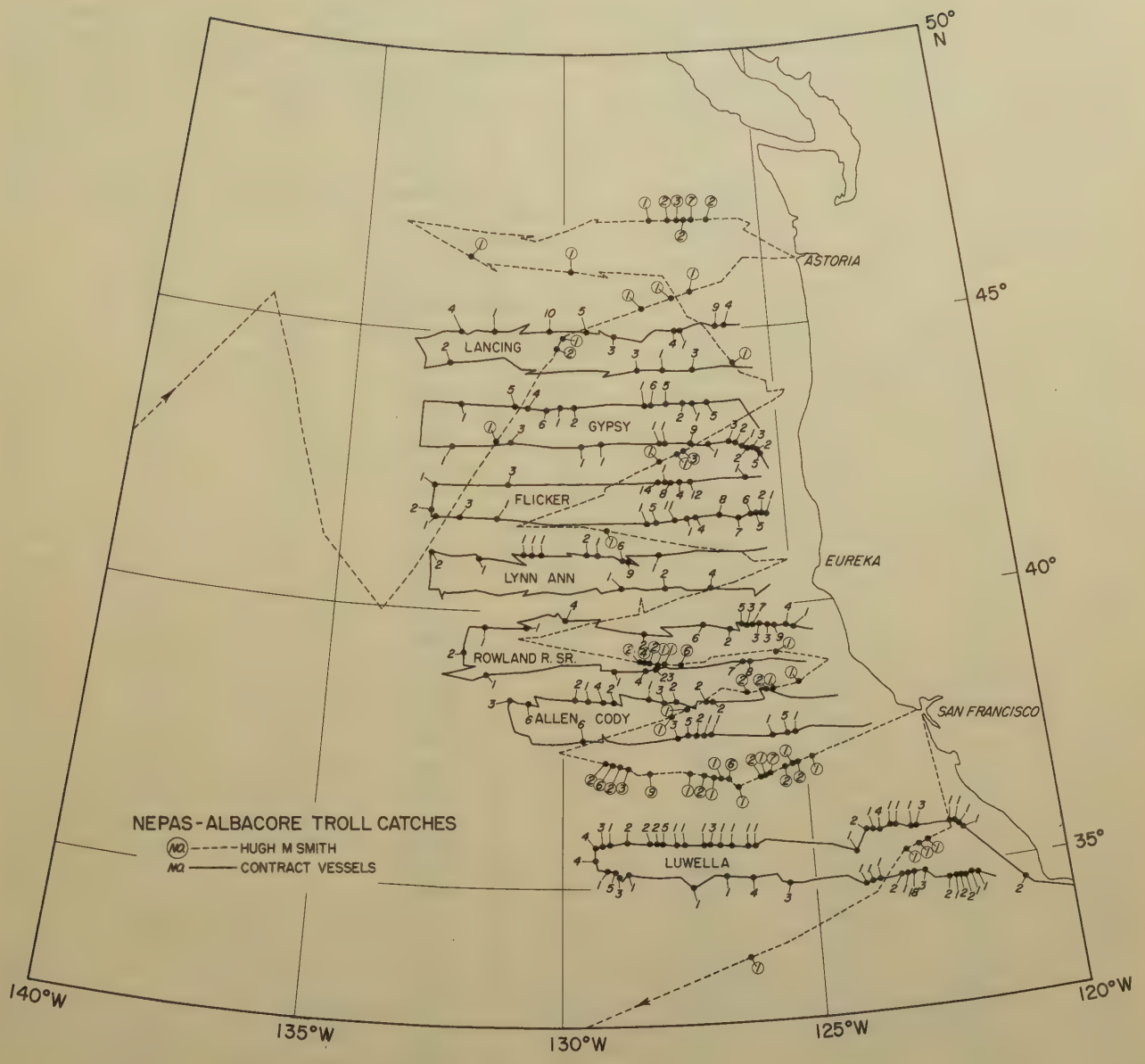

Figure 3. --Albacore tuna catches by the Hugh M. Smith and the charter vessels during the Northeastern Pacific Albacore Survey.

Eight of the charter vessels started the NEPAS survey on schedule on July 22, 1957; the ninth started on July 23. All vessels completed the survey of their assigned tracks on either July 31 or August 1 except the Tuna Clipper and the Lynn. The fresh-water supply of the Lynn became contaminated with salt water and she was forced to withdraw from the survey about 150 miles from her starting point. The Tuna Clipper encountered heavy weather at the start of the survey and was forced to return to port in a leaking condition after completing 30 miles of her track. Several of the other vessels sustained storm damage (e. g., the Luwella broke both trolling booms and her radio antenna), but they were able to make repairs en route and complete their tracks.

RESULTS OF FISHING

Trolling

Charter vessels trolled 6 to 12 lines at speeds generally varying from 5 to 7 knots. Daylight trolling along the tracks was continuous; the vessels drifted at night. The Smith

trolled 5 lines and the Manning 6 to 9 lines at speeds of 5 to 7 knots when in the survey area. A variety of jigs and feathered lures was used by all vessels. The troll catches of albacore are presented in tables 2, 3, and 4 and figures 2 and 3. Catch positions were not available for the charter vessel Lynn.

Albacore taken in viable condition on the troll lines were tagged and released. Charter vessels employed the California type G tag (Wilson 1953); Smith and Manning alternated the use of this tag with a new dart tag (Yamashita and Waldron 1958). The tagging results from each vessel are summarized in table 5. To date, 5 recoveries have been made (Otsu MS)[2/].

[2/] Otsu, T. MS. Albacore migration and growth in the North Pacific Ocean as estimated from tag recoveries. Biological Laboratory, Honolulu.

Table 2.--Albacore troll catch, Hugh M. Smith (cruise 40)

Date 1957	Zone time[1/]	Position		Number of fish	Fork length (cm.)			
		North latitude	West longitude					
7/15	1225	43°04'	131°34'	1	66.5			
7/16	1100	44°47'	130°04'	2	65.0,	75.0		
	1340	44°57'	130°01'	1	79.0			
7/17	0505	45°25'	128°08'	1	67.0			
	1110	45°38'	127°21'	1	68.0			
	1451	45°43'	126°51'	1	67.0			
7/22	1300	47°00'	126°18'	2	75.0,	80.0		
	1550	47°02'	126°35'	2	67.0,	68.0		
	1710	47°02'	126°40'	1	73.1			
	1740	47°02'	126°43'	2	65.4,	-		
	1805	47°02'	126°46'	2	62.2,	66.9		
	1915	47°02'	126°57'	2	65.3,	66.6		
	2045	47°02'	127°06'	1	77.8			
7/23	0505	47°00'	127°06'	2	71.1,	78.9		
	0602	47°00'	127°13'	1	79.3			
	0715	47°00'	127°18'	1	78.0			
	1140	47°01'	127°46'	1	64.9			
7/25	1630	46°22'	132°22'	1	64.8			
7/27	1455	46°05'	129°50'	1	76.5			
7/29	1308	44°20'	125°54'	1	67.3			
7/31	0600	42°48'	127°13'	3	53.8,	54.2,	82.1	
	0715	42°44'	127°23'	1	61.9			
	1110	42°36'	127°50'	1	64.8			
8/2	1545	41°23'	129°08'	1	71.4			
8/8	0525	39°03'	128°25'	2	76.5,	79.5		
	0725	39°01'	128°12'	4	67.1,	68.0,	68.0,	81.6
	0747	39°00'	128°09'	2	65.1,	68.0		
	0930	39°00'	127°58'	1	63.1			
	1005	38°50'	127°55'	1	63.2			
	1610	39°04'	127°31'	3	54.8,	54.8,	65.2	
	1640	39°04'	127°28'	3	52.4,	59.2,	69.7	
8/9	1447	39°09'	125°27'	1	57.5			
8/10	1107	38°37'	125°00'	1	69.2			
	1522	38°31'	125°30'	1	69.6			
	1620	38°30'	125°35'	2	74.5,	81.0		
	1915	38°26'	126°00'	1	66.3			
	1929	38°26'	126°02'	1	78.0			
8/11	0925	38°11'	127°24'	1	56.3			
	1335	38°02'	127°50'	1	65.5			

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 2.--Albacore troll catch, Hugh M. Smith (cruise 40) (cont'd)

Date 1957	Zone time[1]	Position		Number of fish	Fork length (cm.)
		North latitude	West longitude		
8/12	1450	37°16'	129°08'	2	60.4, 64.6
	1515	37°16'	129°06'	4	65.6, 69.0, - , -
	1610	37°15'	129°01'	1	54.9
	1626	37°15'	129°00'	1	55.5
	1653	37°14'	128°57'	1	53.3
	1745	37°11'	128°47'	1	53.4
	1855	37°10'	128°43'	1	-
	1930	37°10'	128°42'	2	67.3, 67.3
8/13	0640	37°02'	128°18'	4	67.2, 70.3, 70.3, -
	0700	37°02'	128°15'	5	69.8, 70.3, 78.6, 83.4, 83.4
	1340	37°01'	127°26'	1	65.3
	1535	36°57'	127°11'	2	- , -
	1655	36°56'	126°57'	1	65.2
	1755	36°54'	126°51'	1	65.9
	1920	36°52'	126°38'	1	66.2
	1935	36°52'	126°36'	5	66.3, 66.8, 66.8, - , -
8/14	0555	36°48'	126°20'	1	57.4
	0920	36°53'	125°58'	2	79.5, 81.1
	0935	36°53'	125°57'	1	-
	1000	36°57'	125°49'	1	67.1
	1025	36°56'	125°45'	4	65.3, 65.3, 67.3, 70.8
	1040	36°56'	125°44'	1	78.9
	1052	36°57'	125°42'	1	77.4
	1250	37°00'	125°27'	2	64.4, 70.0
	1442	37°03'	125°10'	1	75.0
	1600	37°05'	125°09'	2	64.4, 69.4
	1808	37°08'	124°53'	1	67.7
8/27	0825	35°29'	122°40'	1	-
	0945	35°25'	122°50'	1	78.9
	1215	35°19'	123°07'	1	79.5
8/28	1150	33°39'	126°22'	1	85.4

Table 3.--Albacore troll catch, John R. Manning (cruise 36)

Date 1957	Zone time[1]	Position		Number of fish	Fork length (cm.)
		North latitude	West longitude		
6/19	1615	36°52'	142°44'	2	64.5, 66.3
	1630	36°52'	142°44'	1	65.4
	1635	36°52'	142°44'	1	65.6
6/20	1925	37°55'	140°20'	3	63.0, 66.1, 66.6
	1930	37°55'	140°20'	4	64.6, 65.5, 67.4, 66.9
	1940	37°55'	140°20'	1	64.6
	2005	37°55'	140°20'	1	63.9
6/21	0655	38°44'	139°20'	1	64.5
	0745	38°49'	139°15'	2	64.2, 66.8
	0925	38°54'	139°08'	3	78.2, 78.3, 79.9
	1110	39°01'	139°00'	2	63.7, 74.5
	1922	39°40'	138°12'	1	68.5

[1] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 3.--Albacore troll catch, John R. Manning (cruise 36)(cont'd)

Date 1957	Zone time[1/]	Position		Number of fish	Fork length (cm.)
		North latitude	West longitude		
6/22	1510	40°23'	137°06'	1	65.7
	1700	40°34'	136°52'	4	63.0, 66.9, 74.0, 74.2
6/23	1130	41°33'	135°04'	2	75.8, 76.6
	1410	41°11'	135°04'	4	75.0, 76.0, 76.2, 77.6
	1700	40°55'	135°03'	3	66.4, 68.5, -
	1750	40°49'	135°03'	1	65.5
	1820	40°47'	135°03'	1	79.0
	1830	40°46'	135°03'	4	64.2, 65.5, 67.2, 74.8
6/25	0830	39°47'	134°50'	4	61.7, 63.9, 66.7, 73.6
	0905	39°46'	134°49'	4	54.3, 64.3, 65.0, 65.1
	1930	38°32'	134°33'	2	63.9, 68.1
6/27	1510	35°51'	133°47'	1	53.4
6/30	1706	32°58'	129°30'	2	53.4, 53.9
7/1	0855	33°52'	127°34'	2	63.2, 65.5
	1315	34°09'	126°57'	1	77.3
7/2	1120	34°38'	126°01'	1	75.5
	1215	34°40'	125°54'	1	64.4
	1615	34°49'	125°32'	2	61.8, 66.8
	1620	34°49'	125°32'	2	64.6, 70.2
	1645	34°50'	125°28'	2	63.6, 66.8
	1750	34°52'	125°22'	2	65.9, 67.2
7/3	0830	34°56'	126°58'	1	65.7
	0920	34°56'	127°04'	1	75.3
7/4	1730	35°05'	131°52'	1	67.3
7/6	1615	37°11'	129°24'	8	61.5, 61.7, 62.9, 64.7, 65.0
					65.4, 66.3, 68.5
7/7	1625	37°49'	128°28'	2	63.7, 64.2
7/8	0610	38°45'	127°05'	1	64.5
	0710	38°49'	127°00'	4	64.1, 64.3, 66.4, 67.9
	0740	38°51'	126°58'	1	66.2
	0745	38°51'	126°58'	3	63.7, 65.9, 68.5
	1032	39°02'	126°43'	1	66.9
	1100	39°02'	126°42'	2	65.3, 66.2
7/9	1455	39°59'	126°34'	1	65.3
	1705	39°59'	126°51'	3	65.5, 74.1, 77.8
7/10	0920	40°02'	127°07'	3	63.4, 65.7, 65.8
	1035	40°02'	127°16'	1	66.0
	1130	40°02'	127°26'	1	78.9
	1143	40°02'	127°26'	2	63.3, 64.3
	1604	40°01'	127°54'	1	77.8
7/11	0600	40°03'	129°38'	1	76.1
	1906	40°09'	131°31'	1	77.1
7/12	1400	40°11'	132°52'	1	63.9
	1650	40°22'	132°33'	1	62.9
7/14	0700	42°27'	128°57'	1	68.2
	1225	42°51'	128°23'	1	61.7
	1615	43°05'	128°07'	3	66.1, 67.7, 69.2
	1745	43°13'	127°59'	3	66.0, 66.1, 67.1
	1820	43°14'	127°57'	1	66.9
	1840	43°16'	127°56'	1	64.2
	1904	43°17'	127°55'	1	66.1

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 3.--Albacore troll catch, John R. Manning (cruise 36) (cont'd)

Date 1957	Zone time[1/]	Position		Number of fish	Fork length (cm.)			
		North latitude	West longitude					
7/14	1920	43°18'	127°53'	1	63.8			
	2000	43°20'	127°51'	1	64.7			
	2022	43°20'	127°51'	1	64.0			
	2030	43°20'	127°51'	2	64.0,	64.9		
	2035	43°20'	127°51'	1	59.4			
	2040	43°20'	127°51'	1	66.9			
7/23	0635	44°32'	126°21'	2	79.6,	81.2		
	0753	44°26'	126°30'	1	67.7			
	0845	44°21'	126°38'	2	63.4,	66.2		
	1235	44°05'	127°02'	4	62.4,	75.9,	77.5,	79.2
	1450	43°54'	127°17'	1	61.6			
	1920	43°44'	127°46'	1	63.8			
	2000	43°42'	127°51'	1	67.9			
7/24	0930	43°37'	127°40'	2	64.3,	65.7		
	1330	43°28'	127°09'	1	66.4			
	1505	43°16'	127°11'	1	65.7			
	1530	43°13'	127°12'	1	-			
	1730	43°07'	127°22'	2	60.4,	65.2		
	1930	43°00'	127°35'	1	69.2			
	2012	42°57'	127°40'	3	60.2,	64.2,	65.6	
7/25	1545	41°36'	129°56'	1	68.2			
	1947	41°20'	130°17'	1	56.4			
7/26	1945	39°52'	131°16'	1	60.9			
7/27	1350	38°23'	130°25'	1	53.8			
	1400	38°24'	130°23'	1	55.2			
	1630	38°27'	130°11'	1	57.8			
7/28	0610	38°46'	128°44'	1	54.0			
	0640	38°47'	128°40'	3	52.2,	55.4,	58.8	
	0705	38°48'	128°37'	2	54.0,	60.2		
	0745	38°48'	128°39'	1	55.3			
	0835	38°47'	128°39'	2	52.2,	58.8		
	1120	38°48'	128°28'	1	57.2			
	1445	38°49'	128°35'	3	56.9,	57.4,	58.3	
	1545	38°49'	128°40'	1	54.7			
	1600	38°49'	128°40'	1	55.5			
	1610	38°49'	128°44'	2	55.9,	57.0		
7/29	0930	38°47'	128°31'	2	57.5,	-		
	1015	38°48'	128°29'	4	59.3,	73.3,	74.1,	84.3
	1800	39°00'	127°31'	3	53.3,	54.8,	55.4	
8/2	1030	39°27'	127°30'	2	54.1,	55.3		
8/3	0830	38°57'	127°18'	1	63.7			
	1045	38°55'	127°05'	4	74.7,	74.8,	75.1,	83.9
8/4	1135	38°55'	125°36'	2	65.0,	66.3		
	1630	38°58'	126°17'	2	65.5,	76.1		
	1730	38°58'	126°26'	1	62.6			
8/5	0700	38°22'	125°53'	1	68.8			
	0850	38°17'	125°44'	1	74.9			
8/6	0603	37°25'	125°12'	1	65.8			
	0615	37°25'	125°12'	1	67.6			
	0800	37°14'	125°12'	1	60.6			
	1112	37°00'	125°01'	2	62.0,	62.0		
8/7	0725	36°41'	124°29'	1	66.2			

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 3.--Albacore troll catch, John R. Manning (cruise 36) (cont'd)

Date 1957	Zone time[1/]	Position		Number of fish	Fork length (cm.)
		North latitude	West longitude		
8/7	0940	36°35'	124°17'	3	60.7, 66.3, 69.2
	1200	36°29'	124°07'	1	68.1
	1706	36°08'	123°29'	1	59.8
8/8	1645	35°11'	123°23'	3	74.6, 74.9, 80.1
	1900	34°55'	123°22'	2	63.7, 68.0
8/9	0900	34°05'	123°39'	1	64.5
	1030	34°47'	123°45'	1	63.0
	1315	34°50'	124°08'	2	54.2, 57.8
	1320	34°50'	124°10'	1	67.3
	1915	34°46'	124°14'	3	63.8, 66.6, 67.7
8/10	0610	34°19'	125°40'	1	55.8
	0720	34°18'	125°52'	2	52.3, 53.5
	1025	34°17'	126°10'	2	53.1, 54.3
	1800	34°09'	127°08'	1	81.5

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 4.--Albacore troll catch, charter vessels

Date 1957	Zone time[1/]	Position		Number of fish	Fish length (cm.)
		North latitude	West longitude		
Lancing					(Estimated average)
7/22	0900	45°01'	126°12'	4	76
	1130	45°03'	126°22'	9	68
	1715	45°04'	127°11'	1	68
7/23	0430	45°00'	127°19'	4	66
	1600	44°50'	128°54'	1	66
	1645	44°50'	128°54'	2	66
7/24	0930	45°00'	129°40'	5	69
	1820	45°02'	130°20'	2	69
	1840	45°02'	130°20'	8	69
7/25	1430	45°00'	131°45'	1	69
7/26	0845	44°59'	132°30'	3	69
	0930	45°00'	132°30'	1	69
7/27	1530	44°27'	132°50'	2	69
7/30	1120	44°19'	128°20'	3	69
	1845	44°20'	127°20'	1	69
7/31	0800	44°20'	126°55'	3	69
Gypsy					(Estimated average)
7/22	1845	43°40'	126°37'	5	64
	2040	43°42'	126°57'	1	69
7/23	0655	43°40'	127°09'	2	64
	0950	43°42'	127°33'	5	62
	1405	43°42'	127°55'	3	65

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 4.--Albacore troll catch, charter vessels (cont'd)

Date 1957	Zone time[1/]	Position		Number of fish	Fish length (cm.)
		North latitude	West longitude		
Gypsy - (cont'd)					(Estimated average)
7/23	2000	43°42'	127°54'	3	63
7/24	0445	43°40'	128°03'	1	64
7/25	0500	43°38'	128°52'	2	64
	0700	43°00'	130°05'	1	64
	0950	43°35'	130°26'	6	59
	1445	43°40'	130°54'	4	66
	1725	43°42'	131°08'	5	81
7/26	1510	43°41'	132°29'	1	61
7/28	0920	42°57'	132°33'	1	76
	1915	43°02'	131°15'	1	66
	1930	43°02'	131°15'	2	69
7/29	1825	42°57'	129°35'	1	53
7/30	0830	43°00'	129°10'	1	53
	1930	43°00'	127°48'	1	53
7/31	0530	42°59'	127°43'	1	64
	1105	42°57'	126°59'	3	66
	1210	42°57'	126°59'	1	58
	1225	42°57'	126°58'	1	66
	1235	42°57'	126°57'	4	69
	1420	42°55'	126°39'	1	66
	1830	42°59'	126°10'	3	69
	2005	42°57'	126°05'	2	66
8/1	0705	42°49'	125°50'	1	66
	0825	42°50'	125°47'	2	81
	0900	42°50'	125°11'	1	69
	0920	42°50'	125°38'	1	79
	0940	42°50'	125°37'	1	81
	0950	42°50'	125°36'	2	76
	1005	42°50'	125°34'	5	74
Flicker					(Fork length, cm.)
7/22	0800	42°20'	125°42'	1	63
7/23	0545	42°20'	127°03'	9	64, 64, 64, 64, 65, 65, 65, 66, 68
	0610	42°20'	127°03'	3	63, 64, 65
	0900	42°20'	127°25'	4	63, 63, 65, 67
	0945	42°20'	127°33'	8	61, 64, 64, 65, 65, 66, 78, 78
	1030	42°20'	127°36'	1	71
	1235	42°20'	127°50'	8	64, 65, 66, 66, 66, 67, 74, 79
	1300	42°20'	127°51'	6	65, 65, 65, 66, 68, 69
7/25	1515	42°22'	131°17'	3	54, 54, 54
7/26	1700	42°15'	133°00'	1	76
7/27	0800	41°44'	133°00'	2	54, 55
	1000	41°40'	132°53'	1	56
	1400	41°40'	132°25'	3	54, 54, 54

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 4. --Albacore troll catch, charter vessels (cont'd)

Date 1957	Zone time[1/]	Position		Number of fish	Fish length (cm.)
		North latitude	West longitude		
Flicker - (cont'd)					(Fork length, cm.)
7/28	0630	41°39'	131°30'	1	64
7/30	0845	41°34'	128°03'	1	64
	1000	41°35'	127°56'	5	54, 54, 54, 54, 66
	1430	41°37'	127°30'	11	55, 55, 55, 59, 60, 61, 61, 62, 65, 66, 67
	1730	41°39'	127°15'	1	57
	1945	41°40'	127°04'	1	66
	2000	41°40'	127°04'	3	55, 56, 57
7/31	0845	41°40'	126°35'	5	64, 65, 65, 66, 68
	0910	41°40'	126°33'	3	52, 64, 65
	1400	41°40'	126°07'	3	63, 64, 66
	1430	41°40'	126°04'	4	64, 65, 66, 66
	1645	41°40'	125°51'	6	63, 64, 64, 65, 65, 65
	1750	41°40'	125°46'	5	64, 66, 67, 69, 75
	1900	41°40'	125°40'	2	64, 66
	2030	41°40'	125°30'	1	65
Lynn Ann					(Estimated average)
7/23	1245	41°00'	127°57'	1	65
7/24	0825	40°55'	128°37'	6	61
	0900	40°55'	128°37'	2	61
	0940	40°56'	128°40'	1	61
	1115	40°59'	128°47'	6	57
	1550	41°00'	129°23'	1	-
	1715	41°01'	129°30'	2	-
7/25	1320	41°00'	130°33'	1	65
	1715	41°01'	130°46'	1	58
	1855	41°01'	130°54'	1	80
7/26	1530	40°57'	131°56'	1	58
7/27	1155	41°00'	133°00'	2	55
7/30	1007	40°24'	128°42'	1	78
	1715	40°24'	127°45'	2	64
7/31	1147	40°22'	126°43'	4	66
Rowland R. Sr.					(Fork length, estimated)
7/22	0805	39°34'	125°00'	1	67
	0930	39°35'	125°10'	4	67, 70, 70, 73
	1200	39°37'	125°35'	9	65, 67, 67, 67, 67, 69, 69, 69, 70
	1310	39°40'	125°40'	3	69, 70, 70
	1422	39°41'	125°47'	1	69
	1450	39°41'	125°49'	2	61, 65
	1620	39°42'	125°59'	6	61, 63, 66, 66, 68, 69
	1645	39°42'	125°00'	1	69
	1720	39°42'	126°04'	3	67, 67, 69
	1820	39°42'	126°08'	5	65, 67, 69, 70, -

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 4.--Albacore troll catch, charter vessels (cont'd)

Date 1957	Zone time[1/]	Position		Number of fish	Fish length (cm.)
		North latitude	West longitude		
Rowland R. Sr.					(Fork length, estimated)
7/23	0542	39°40'	126°25'	2	69, 70
	1145	39°44'	127°00'	6	61, 66, 69, 69, 69, 70
7/24	1100	39°34'	128°14'	2	69, 69
7/25	1107	39°48'	130°00'	4	56, 56, 57, 57
7/26	0600	39°44'	130°45'	1	55
	1508	39°45'	131°44'	1	53
7/27	1405	39°15'	132°13'	2	56, 57
7/28	1355	38°50'	131°41'	1	57
7/30	0845	38°56'	128°56'	1	57
	1425	38°55'	128°15'	2	53, 57
	1455	38°56'	128°12'	2	59, 63
	1630	38°58'	128°00'	23	53, 53, 53, 53, 53, 55, 55, 56, 56, 56, 56, 56, 56, 56, 56, 56, 56, 57, 57, 57, 57, -
7/31	0750	39°05'	126°16'	3	61, 61, 62
8/1	0530	39°04'	126°18'	1	66
	0645	39°04'	126°17'	3	65, 66, 69
	0715	39°03'	126°08'	4	67, 67, 69, -
	0730	39°03'	126°06'	1	69
	0740	39°02'	126°06'	3	66, 67, 69
Allen Cody					(Fork length)
7/24	1430	38°18'	126°52'	2	55.6, 55.6
	1635	38°18'	127°08'	2	57.3, 58.7
7/25	1100	38°21'	127°42'	2	56.3, 59.4
	1230	38°23'	127°53'	3	61.5, 66.0, 78.6
	1540	38°25'	128°10'	1	61.0
7/26	0710	38°21'	128°52'	2	56.0, 57.6
	0835	38°25'	129°03'	4	53.8, 54.5, 54.9, 55.4
	1020	38°25'	129°18'	1	75.7
	1425	38°25'	129°47'	2	53.9, 54.9
7/27	0900	38°23'	130°44'	6	53.0, 53.0, 53.9, 54.4, 55.0, 55.5
	1135	38°24'	131°11'	3	53.0, 53.3, 54.0
7/28	1340	37°37'	129°42'	6	53.9, 57.0, 57.0, 67.4, 82.7, 86.7
7/30	0830	37°42'	127°37'	3	58.7, 59.5, 62.5
	0920	37°42'	127°29'	4	56.0, 57.0, 58.4, 59.0
	0935	37°42'	127°27'	1	56.0
	1035	37°41'	127°20'	2	66.0, 67.0
	1245	37°40'	127°03'	1	57.9
	1320	37°40'	126°55'	1	65.7
7/31	1125	37°39'	125°39'	1	72.4
	1415	37°40'	125°22'	5	4 fish estimated - 65 cm., 67.5
	1535	37°42'	125°10'	1	68.4

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 4.--Albacore troll catch, charter vessels (cont'd)

Date 1957	Zone time[1/]	Position		Number of fish	Fish length (cm.)
		North latitude	West longitude		
Tuna Clipper					(Fork length)
7/22	1017	37°00'	123°18'	1	78.5
Luwella					(Fork length)
7/22	0630	35°39'	122°04'	1	68.0
	0740	35°41'	122°10'	1	73.0
	0810	35°45'	122°12'	1	67.5
	1300	35°44'	122°45'	1	64.5
	1610	35°43'	122°58'	3	55.5, 59.2, 64.9
	1700	35°41'	123°04'	1	68.5
7/23	0600	35°48'	123°22'	1	75.8
	0630	35°48'	123°27'	1	53.7
	1000	35°45'	123°37'	4	54.1, 65.9, 66.5, 79.5
	1100	35°48'	123°46'	1	52.4
	1200	35°42'	123°54'	1	61.5
	1230	35°41'	123°55'	1	63.5
	1630	35°27'	124°20'	1	66.4
7/25	1145	35°35'	126°22'	1	76.0
	1300	35°36'	126°30'	1	75.5
	1655	35°42'	126°42'	1	62.3
7/26	0640	35°42'	126°58'	1	59.5
	0720	35°43'	127°03'	1	57.5
	0745	35°43'	127°05'	2	52.9, 54.5
	0810	35°45'	127°12'	1	53.5
	1130	35°45'	127°35'	1	65.5
	1220	35°45'	127°41'	1	65.5
	1340	35°44'	128°02'	5	64.0, 64.5, 64.5, 64.5, 65.5
	1430	35°44'	128°06'	2	55.0, 67.0
	1533	35°45'	128°15'	2	65.5, 67.1
7/27	0645	35°44'	128°41'	2	64.0, 68.1
	1000	35°44'	129°10'	1	53.3
	1035	35°44'	129°14'	1	68.0
	1100	35°44'	129°17'	2	64.1, 67.4
	1145	35°45'	129°23'	1	59.1
	1235	35°44'	129°22'	3	53.5, 64.0, 66.5
	1400	35°30'	129°20'	1	60.6
	1425	35°28'	129°28'	3	60.5, 65.3, 66.5
	1609	35°21'	129°12'	1	65.0
	1700	35°18'	129°07'	1	68.0
	1715	35°18'	129°06'	4	64.5, 65.0, 65.5, 66.5
	1925	35°10'	128°50'	3	51.2, 63.8, 66.5
7/28	0800	35°11'	128°44'	1	53.2
7/29	0620	35°04'	127°24'	2	69.4, 70.0
	1155	35°07'	126°47'	1	66.6
	1640	35°07'	126°11'	4	64.5, 65.5, 67.5, 67.7
	1914	35°08'	126°00'	2	65.9, 66.1
7/30	0730	34°57'	125°30'	3	64.5, 75.0, 75.5
7/31	0545	34°48'	124°00'	1	63.5

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 4.--Albacore troll catch, charter vessels (cont'd)

Date 1957	Zone time[1]	Position		Number of fish	Fish length (cm.)
		North latitude	West longitude		
Luwella - (cont'd)					(Fork length)
7/31	0740	34°49'	124°05'	1	66.5
	0940	34°54'	123°50'	1	77.0
	1523	34°55'	123°20'	2	65.5, 67.5
	1615	34°56'	123°13'	1	72.4
	1640	34°56'	123°09'	18	59.0, 62.5, 63.5, 63.5, 64.0, 64.5, 65.0, 65.5, 65.5, 65.5, 66.0, 66.5, 66.5, 67.0, 67.4, 68.3, 71.3, 75.5
	1910	34°56'	122°50'	3	64.5, 66.5, 67.5
8/1	0743	34°48'	122°24'	2	64.5, 66.3
	0805	34°49'	122°21'	1	68.5
	0830	34°49'	122°16'	1	64.5
	0900	34°49'	122°13'	1	66.5
	1000	34°49'	122°06'	2	66.0, 68.3
	1100	34°49'	122°00'	1	68.5
	1130	34°49'	121°57'	1	66.5

[1] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 5.--Troll catch and number of albacore tuna tagged by Honolulu Biological Laboratory and charter vessels

Track number	Vessel	Total catch	Total tagged
-	Hugh M. Smith	112	71
-	John R. Manning	226	104
2	Lynn	23	10
3	Lancing	50	0
4	Gypsy	75	61
5	Flicker	102	100
6	Lynn Ann	32	21
7	Rowland R. Sr.	97	0
8	Allen Cody	53	29
9	Tuna Clipper	1	0
10	Luwella	108	72
Total		879	468

Gill-net Fishing

Eighteen shackles of gill nets with meshes varying from 4 1/2 to 7 1/2 inches, stretched measure, were fished by the Manning. An individual set consisted of a 7 1/2-inch mesh shackle placed at each end of the set and adjoining one of these was a 4 1/2-inch mesh shackle; and eight 5 1/2-inch mesh and seven 6 1/2-inch mesh shackles were alternated in the center of the set. Construction details of the nets are given by Graham and Mann (MS)[3].

Sets were usually made at dusk and retrieved at dawn. One 24-hour station was completed in an area of abundance off Point Arena immediately following an overnight set in which 42 albacore were captured (fig. 2). The 18-shackle set was halved for this operation and five baskets of longline, described below, were attached to an end of each half. Four 6-hour consecutive sets were made, alternating the two halves, between the hours of 1500 on July 30 and 1531 on July 31.

Gill-net catches made during the cruise are given in tables 6 and 7; the lengths of the albacore caught are listed in table 8. A list of the common names of fishes appearing in these tables and other portions of this report is presented in table 9 along with the corresponding scientific names.

[3] Graham, J. J. and H. J. Mann. MS. Construction and catch selectivity of albacore gill nets in the central North Pacific. Biological Laboratory, Honolulu.

Table 6.--Gill net and attached longline catch, John R. Manning (cruise 36)

Station	Date 1957	Set position		Albacore	Great blue shark	Pomfret	Squid	Miscellaneous	Total	Longline
		North latitude	West longitude							
9	6/18	36°09'	142°52'	0	0	5	2	1 dolphin	8	1 bigeye tuna
11	6/19	36°53'	141°41'	40	1	7	2	1 dolphin	51	
14	6/21	39°42'	138°11'	2	1	3	0	0	6	3 great blue shark
20	6/24	39°57'	134°56'	0	0	6	0	1 scad	7	1 great blue shark
23	6/25	38°32'	134°33'	4	0	3	0	0	7	
24	6/26	36°52'	133°51'	3	1	2	2	0	8	
34	7/1	34°25'	126°24'	2	0	17	0	4 scad	23	3 great blue shark
43	7/5	36°37'	130°12'	7	0	17	1	1 scad 1 dolphin	27	1 great blue shark
46	7/6	37°19'	129°10'	0	1	34	2	7 scad	44	2 great blue shark
50	7/9	39°59'	126°51'	4	37	7	0	5 scad	53	9 great blue shark
66	7/23	43°42'	127°53'	17	23	42	3	1 scad	86	2 great blue shark
81	7/28	38°45'	128°37'	3	10	14	0	0	27	1 great blue shark
83	7/29	39°00'	127°31'	42	45	44	3	14 scad 2 unidentified tuna 1 bonito shark	151	1 great blue shark
83[1/]	7/30	39°01'	127°26'	23	42	34	3	0	102	9 great blue shark
99	8/6	36°45'	124°34'	0	24	10	0	8 scad 1 Risso porpoise	43	9 great blue shark
102	8/9	34°50'	124°10'	3	21	30	1	30 scad 8 unknown	93	10 great blue shark
Total				149[2/]	206	275	19	71 scad 8 unknown 3 dolphin 2 unidentified tuna 1 bonito shark 1 Risso porpoise	736	51 great blue shark 1 bigeye tuna

[1/] 24-hour station.

[2/] An additional unidentified tuna was taken in the gill net and mistaken for albacore. Thus its station could not be determined and the albacore total is given as 149 rather than the 150 to which the column totals.

Table 7.--Twenty-four hour gill-net station 83, 38°58'N., 127°28'W., 7/30-7/31, John R. Manning (cruise 36)

Zone time[1]	Albacore		Great blue shark		Pomfrets		Squid		Attached longline catch-great blue shark		Totals
	alive	dead	alive	dead	alive	dead	alive	dead	alive	dead	
1502-2153	0	6	1	3	7	3	1	0	1	0	22
2003-0358	0	17	12	9	3	16	1	0	1	1	63[2]
0230-0942	0	0	11	3	0	5	0	0	0	0	20[3]
0828-1531	0	0	2	0	0	0	0	0	3	1	6
Total	0	23	26	15	10	24	2	0	5	2	

[1] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

[2] One squid and 1 great blue shark not recorded as to viableness.

[3] One great blue shark not recorded as to viableness.

Table 8.--Length frequency of albacore captured in gill nets

Fork length (cm.)	Station												Total
	11	14	23	24	34	43	50	66	81	83	24-hour station	102	
50	-	-	-	-	-	-	-	-	-	2	-	-	2
51	-	-	-	-	-	-	-	-	-	10	2	-	12
52	-	-	-	-	-	-	-	-	-	6	4	-	10
53	-	-	-	-	-	-	-	-	-	4	2	-	6
54	-	-	1	-	-	-	-	-	1	8	1	-	11
55	-	-	-	-	-	-	-	-	-	2	5	-	7
56	1	-	-	-	-	-	-	-	2	3	2	-	8
57	-	-	-	-	-	-	-	-	-	2	1	-	3
58	-	-	-	-	-	-	-	-	-	-	-	-	-
59	1	-	-	-	-	-	-	-	-	-	-	-	1
60	4	-	-	-	-	-	-	-	-	-	-	-	4
61	2	-	-	-	-	-	1	-	-	1	-	-	4
62	6	-	-	-	-	-	-	1	-	-	1	-	8
63	4	-	-	-	-	2	-	1	-	-	1	1	9
64	5	1	-	1	-	3	1	3	-	2	-	-	16
65	6	-	-	1	1	1	-	6	-	-	-	1	16
66	6	-	3	-	-	1	-	2	-	-	1	-	13
67	2	-	-	-	1	-	2	1	-	-	1	-	7
68	-	-	-	1	-	-	-	1	-	-	-	1	3
69	-	-	-	-	-	-	-	-	-	1	-	-	1
70	-	-	-	-	-	-	-	-	-	-	-	-	-
71	-	-	-	-	-	-	-	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-	-	-	-
73	-	-	-	-	-	-	-	-	-	-	1	-	1
74	-	1	-	-	-	-	-	1	-	-	-	-	2
75	-	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	1	-	-	-	-	1
77	-	-	-	-	-	-	-	-	-	1	-	-	1
78	-	-	-	-	-	-	-	-	-	-	-	-	-
79	-	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 9.--Common and scientific names of fishes mentioned in this report

Common name	Scientific name
Albacore tuna	Germo alalunga (Bonnaterre)
Bigeye tuna	Parathunnus sibi (Temminck and Schlegel)
Bonito shark	Isurus glaucus (Müller and Henle)
Dolphin	Coryphaena hippurus (Linnaeus)
Flying fish	Exocoetidae
Great blue shark	Prionace glauca (Linnaeus)
Lantern fish	Myctophidae
Pomfret	Brama raii (Block)
Saury	Cololabis saira (Brevoort)
Scad	Trachurus symmetricus (Ayres)
Skipjack tuna	Katsuwonus pelamis (Linnaeus)
Sunfish	Mola mola (Linnaeus)

Longline Fishing

Five baskets of longline were fished with each set of gill nets by attaching them to an end of the set. The longline was similar to that used previously to fish albacore in this area (Mann 1955). The basic unit or basket consisted of 210 fathoms of mainline to which floats were attached at either end. Three-fathom droppers with 1 1/2-fathom leaders were suspended from the mainline at 15-fathom intervals so that there were 13 hooks to a basket. This basic gear was modified to fish at varying depths by changing the depth of the floatline and placing an extra buoy at the center of the basket (omitting the hook at that position). The five baskets were arranged in the following order, starting at the attached end: Two had 3 buoys (one in the center) and no floatlines; two had 2 buoys and no floatlines; and the fifth had 2 buoys and 2-fathom floatlines. A sounding tube (Graham 1957) was placed on each basket of gear; and these showed that during the cruise the minimum fishing depth was about 25 feet and the maximum about 430 feet. No albacore were taken on this gear (tables 6 and 7).

A single albacore (68.6 cm. in fork length) was captured on a special set of longline which replaced a scheduled gill-net station cancelled because of a winch breakdown. Five baskets, each equipped with 3 buoys (one in the center) and no floatlines, were fished. This special set was made immediately following a catch of fish on trolling lines and extended from 1345 through 1800 hours (fig. 2). The hooks were baited with small herring (< 6 inches), in contrast to the five baskets attached to gill nets on which large herring (> 6 inches) were used.

STOMACH ANALYSES

One hundred and ninety-five albacore stomachs were examined in the field and 43 stomachs, believed to contain food, were preserved for laboratory analysis. In the field study, food items were divided into the following major groups: Squid, saury, other fish, shrimp-like plankton, and copepod and amphipod-like plankton. Food items of the first three groups were rated as to size by considering total lengths less than 5 inches as small, 5 through 10 inches as medium, and greater than 10 inches as large. The displacement volume ($\geq$5 ml.) of the contents of each stomach was determined and any unidentifiable remains noted. The data obtained with both types of gear, troll and gill net, are presented in table 10.

HOLDING EXPERIMENTS

The rectangular port brine tank, 8 1/2 feet deep and 6 1/2 feet wide fore and aft, of the John R. Manning was used to hold troll-caught albacore which were landed alive and in good condition. Water entering the tank flowed diagonally across the upper portion of the tank and then returned along its sides and bottom. Water was removed from the bottom diagonally across from the inflow. The volume of flow was such that the contents of the 2,150-gallon tank were replaced approximately every 35 minutes. Fourteen albacore, ranging from 54 cm. to 68 cm. in fork length, were held in the tank for periods varying from a few minutes to 14 hours (table 11).

NIGHT-LIGHT OBSERVATIONS

Observations of organisms under lights were made from the Smith (table 12), the Manning (table 13), and two charter vessels (table 14) while they were drifting at night. The Smith made her observations under deck lights, which remained on all night, by estimating every 2 hours the number and size of sauries present. The Manning turned on the deck lights for 1 hour during darkness and estimated the number, and usually the size, of sauries and squids which were attracted. The charter vessel Flicker made observations between 2130 and 2200 hours each night using a single sealed-beam light. Twenty or fewer sauries, when seen at one instant during the period of observation, were classed as few, 21 to 50 as moderate, and 51 or more as abundant. The Rowland R. Sr. made her observations at 2200 and the amount of bait or forage and the amount of luminescence were recorded in relative terms.

SIGHTINGS OF FISH, BIRDS, AQUATIC MAMMALS

The wheel watches of the Smith and Manning maintained logs of fish, birds, and aquatic mammals sighted during the daylight hours. These observations are tabulated in tables 15 and 16. The charter vessels also maintained a rough log of such sightings which are tabulated in table 17.

Table 10.--Field examination of albacore stomach contents, John R. Manning (cruise 36)
Gill net-caught fish, (S = < 5 inches, M = 5-10 inches, L = > 10 inches)

Date 1957	Station	Squid			Saury			Other fish			Plankton		Unidentifiable remains	Volume ml.
		S	M	L	S	M	L	S	M	L	Shrimp-like	Copepod and amphipod-like		
6/20	11	-	-	-	-	2	-	-	-	-	-	-	x	40
6/20	11	2	-	-	-	-	-	3	-	-	1	-	x	10
6/20	11	-	-	-	-	-	-	1	1	-	1	-	x	25
6/20	11	1	-	-	-	-	-	1	-	-	3	-	x	10
6/20	11	-	-	-	-	-	3	-	-	-	-	-	-	110
6/20	11	-	-	-	-	2	-	-	-	-	-	-	-	60
6/20	11	3	1	-	-	-	-	-	-	-	7	-	-	10
6/20	11	-	1	-	-	-	-	-	-	-	1	-	x	7
6/20	11	3	-	-	1	-	-	7	-	-	-	-	x	20
6/20	11	26 albacore examined, all < 5 ml.												< 5
6/22	14	2 albacore examined, both < 5 ml.												< 5
6/26	23	4 albacore completely empty												< 5
7/2	34	-	1	-	-	-	-	-	1	-	-	-	x	8
7/2	34	-	-	-	-	-	-	-	-	-	-	-	x	< 5
7/6	43	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/6	43	2	-	-	-	-	-	-	1	-	-	-	x	13
7/6	43	6	2	-	-	1	-	1	-	-	-	-	x	20
7/6	43	-	-	1	-	-	-	-	-	-	-	-	x	9
7/6	43	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/6	43	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/10	50	-	1	-	-	-	-	-	-	-	-	-	-	6
7/10	50	3 albacore examined, all < 5 ml.												< 5
7/24	66	-	3	-	-	-	-	-	-	-	-	-	-	10
7/24	66	16 albacore examined, all < 5 ml.												< 5
7/29	81	3 albacore examined, all < 5 ml.												< 5
7/30	83	37 albacore examined, all < 5 ml.												< 5
8/8	102	3 albacore examined, all < 5 ml.												< 5

Table 10.--Field examination of albacore stomach contents, John R. Manning (cruise 36) (cont'd)
Troll-caught fish, (S = < 5 inches, M = 5-10 inches, L = > 10 inches)

Date 1957	Zone time of capture	Squid			Saury			Other fish			Plankton		Unidentifiable remains	Volume ml.
		S	M	L	S	M	L	S	M	L	Shrimp-like	Copepod and amphipod-like		
6/19	1615	9	-	-	-	-	-	4	-	-	2	-	x	35
6/19	1635	-	-	-	-	-	-	-	-	-	-	-	-	< 5
6/20	1930-2005[1/]	-	-	-	-	-	-	1	-	-	-	3	x	10
6/20	"	-	-	-	-	-	-	-	-	-	-	-	x	< 5
6/21	0655-1922	-	-	-	-	-	1	1	-	-	-	-	x	45
6/21	"	-	-	-	3	-	-	14	-	-	-	-	-	15
6/21	"	-	-	-	-	-	-	-	-	-	-	-	-	< 5
6/22	1700	-	-	-	2	-	-	4	-	-	-	-	x	20
6/22	"	-	-	-	2	-	-	2	-	-	1	-	x	15
6/23	1130-1830	-	-	-	-	-	-	2	1	-	-	-	x	10
6/23	"	-	-	-	-	1	-	3	-	-	-	-	x	20
6/23	"	-	-	-	6	-	-	-	-	-	-	-	x	35
6/23	"	-	-	-	-	3	1	-	-	-	-	-	-	40
6/23	"	-	-	-	3	-	-	-	-	-	-	-	-	10
6/25	0830-1930	4	-	-	-	-	-	-	-	-	1	-	x	10
6/25	"	-	-	-	4	-	-	-	-	-	-	-	x	10
6/25	"	-	3	-	2	-	-	-	-	-	-	-	x	25
6/25	"	-	-	-	9	-	-	-	-	-	-	-	-	15
6/25	"	-	-	-	-	-	1	-	-	-	-	-	x	20
6/25	"	-	-	-	-	-	-	-	-	-	-	-	x	< 5
6/25	"	-	-	-	2	-	-	-	-	-	-	-	x	6
6/27	1510	-	-	-	-	-	-	-	-	-	-	-	-	< 5
6/30	1705	1	-	-	-	-	-	2	-	-	-	1	-	5
7/1	0855-1315	-	1	-	-	-	-	-	-	-	1	-	-	15
7/1	"	-	1	-	-	-	-	-	-	-	-	-	x	8
7/2	1120	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/2	1620	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/2	1645	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/2	1750	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/2	"	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/2	1620	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/3	0920	-	-	-	-	-	-	-	1	-	-	-	-	7
7/6	1615	-	-	-	11	-	-	-	-	-	-	-	-	20
7/6	"	-	-	-	13	-	2	-	-	-	-	-	-	80
7/6	"	-	-	-	-	-	-	-	-	-	-	-	-	< 5

[1/] Exact time of capture not determined.

Table 10.--Field examination of albacore stomach contents, John R. Manning (cruise 36) (cont'd)
Troll-caught fish (S = < 5 inches, M = 5-10 inches, L = >10 inches) (cont'd)

Date 1957	Zone time of capture	Squid			Saury			Other fish			Plankton		Unidentifiable remains	Volume ml.
		S	M	L	S	M	L	S	M	L	Shrimp-like	Copepod and amphipod-like		
7/7	1625	-	-	-	-	-	1	-	-	-	-	-	-	25
7/8	0610	-	-	-	3	-	-	-	-	-	-	-	-	6
7/8	0710	-	-	-	6	-	-	-	-	-	-	-	-	11
7/8	"	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/8	0745	-	-	-	4	5	-	-	-	-	-	-	-	30
7/8	"	-	-	-	7	-	-	-	-	-	-	-	-	12
7/8	1100	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/8	"	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/10	0920	-	-	-	-	-	1	-	-	-	-	-	x	38
7/10	"	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/10	1035	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/10	1140	-	-	-	-	2	1	-	-	-	-	-	x	15
7/10	1142	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/12	1650	5	-	-	-	-	-	1	-	-	-	-	-	10
7/14	0700	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/14	1615	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/14	1745	-	-	-	-	-	1	-	-	-	-	-	x	10
7/14	1820	-	-	-	-	7	-	-	-	-	-	-	-	50
7/14	1904	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/14	2022	-	-	-	3	-	-	-	-	-	-	-	-	7
7/14	2035	3	-	1	-	3	-	-	-	-	-	-	x	40
7/23	1235	-	1	-	-	-	-	-	-	-	-	-	x	5
7/23	0635	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/23	0753	-	-	-	1	-	-	-	-	-	-	-	x	< 5
7/23	0635	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/23	0845	-	-	-	-	-	-	-	-	-	-	-	x	20
7/23	1235	-	-	-	-	-	-	-	-	-	-	-	x	15
7/23	1450	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/23	1920	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/23	2000	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/24	1930	-	-	-	-	2	-	-	-	-	-	-	-	8
7/25	1545	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/25	1950	-	1	-	-	-	-	-	-	-	-	-	-	6
7/28	0610	-	-	-	-	-	-	4	-	-	-	-	-	15
7/28	0640	3	-	-	-	-	-	6	-	-	-	-	x	15
7/28	1545	-	-	-	-	-	-	-	-	-	-	-	-	< 5
7/28	0705	-	-	-	-	-	-	-	-	-	-	-	-	< 5

Table 10.--Field examination of albacore stomach contents, John R. Manning (cruise 36) (cont'd)
Troll-caught fish (S = < 5 inches, M = 5-10 inches, L = > 10 inches) (cont'd)

Date 1957	Zone time of capture	Squid			Saury			Other fish			Plankton		Unidentifiable remains	Volume ml.
		S	M	L	S	M	L	S	M	L	Shrimp-like	Copepod and amphipod-like		
7/29	0930	-	-	-	-	-	-	-	-	-	-	-	-	< 5
8/3	0830	-	-	-	-	-	-	-	8	-	-	-	-	30
8/3	1045	-	-	-	1	-	2	-	-	-	-	-	-	110
8/3	"	-	-	-	-	1	-	-	-	-	-	-	-	30
8/3	"	-	-	-	2	-	3	-	-	-	-	-	-	273
8/4	1135	-	-	-	-	-	-	-	-	-	-	-	-	< 5
8/4	1630	-	-	-	-	-	-	-	2	-	-	-	-	12
8/5	0850	-	-	-	-	-	-	-	-	-	-	-	-	< 5
8/6	0600	-	-	-	-	-	-	-	-	-	-	-	-	< 5
8/6	1112	-	-	-	-	-	-	-	1	-	-	-	x	8
8/10	0610	-	-	-	-	-	-	-	-	-	-	-	-	< 5

Table 11.--Albacore holding experiments, John R. Manning (cruise 36)

Date 1957	Length of troll line (feet)	Time placed in tank	Time of death	Survival time hours	Remarks
7/23	150	2000	2030	1/2	
7/23	150	1920	2030	1-1/4	
7/24	135	0930	0945	1/4	Lampblack applied to the eyes.
7/24	65	0930	0945	1/4	" " " " "
7/24	90	1445	1500	1/4	
7/24	90	1530	2000	4-1/2	Jumped out of tank.
7/25	65	1615	0300-0700, 7/26[1/]	10-3/4 - 14-3/4	Rough weather
7/26	150	1945	1950	< 1/4	
7/27	150	1630	2130	5	Artificial respiration with hose
7/28	150	0610	0815	1/2	
7/28	80	0640	1045	3	No separate tally kept on individual fish.
7/28	90	0640	1045	3	No line assigned for individual fish.
7/28	65	0640	1500	7-1/4	Survival time figured from 0745.
7/28	65	0745	2200	14-1/4	

[1/] Exact time of death not determined.

Table 12.--Night-light observations of sauries by the Hugh M. Smith (cruise 40)

Date 1957	Zone time[1/]	North latitude	West longitude	Numbers estimated	Estimated length in inches
7/17	2030	45°54'	125°27'	1,000	6
7/23	0020	47°02'	127°10'	0	-
	0200	47°02'	127°08'	0	-
	2200	47°00'	129°08'	1,000	4-8
7/24	0100	47°00'	129°08'	1,000	1-14
	0430	47°02'	129°09'	1,000	1-14
7/25	0200	46°46'	130°46'	0	-
7/29	0200	45°12'	126°46'	0	-
	0400	45°10'	126°44'	1,000	3-4
7/30	0230	43°49'	124°43'	1,000	3-4
7/31	0000	42°55'	127°01'	10	2
	0200	42°53'	127°02'	1,000	3-4
	0400	42°51'	127°02'	0	-
8/1	0200	42°13'	129°08'	0	-
	0500	42°10'	129°09'	10	3-4
8/2	0200	41°33'	130°41'	50	1-3
	0430	41°31'	130°44'	0	-
	0445	41°31'	130°44'	1	14
8/3	0200	41°17'	128°19'	0	-
8/4	0000	40°58'	126°00'	10	3
	0200	40°52'	125°57'	6	4-6
	2355	40°25'	126°16'	0	-
8/5	0200	40°25'	126°19'	0	-
	0435	40°23'	126°21'	0	-
8/7	0200	39°30'	131°00'	0	-
	2355	39°07'	128°40'	0	-
8/8	0200	39°06'	128°40'	0	-
8/9	0000	39°03'	127°00'	0	-
	0200	39°05'	126°55'	0	-
8/10	0000	38°56'	124°24'	0	-
	0200	38°54'	124°22'	1	5
8/13	0000	37°09'	128°35'	0	-
	0200	37°06'	128°32'	0	-
8/14	0000	36°51'	126°33'	0	-
	0200	36°49'	126°31'	0	-
	0430	36°46'	126°28'	0	-

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 13.--Night-light observations by the John R. Manning (cruise 36)

Date 1957	Position		Present not persistent	Numbers persistent under the lights			Approximate size	
	North latitude	West longitude		1-5	6-10	11-30	Sauries	Squids
6/18	36°10'	142°52'	-	Myctophids	-	-	-	-
				Squids	-	-	-	> 12 inches
6/19	36°53'	141°41'	Myctophids	Sauries	-	-	< 4 inches	-
				Squids	-	-	-	> 12 inches
6/21	39°43'	138°09'	Sauries	-	-	-	-	-
			Squids	-	-	-	-	> 12 inches
6/24	39°57'	134°56'	-	Sauries	-	-	< 4 inches	-
6/25	38°30'	134°35'	Myctophids	Sauries	-	-	-	-
			Squids	-	-	-	-	> 12 inches
6/26	36°49'	133°51'	Sauries	-	-	-	< 4 inches	-
			Myctophids	-	-	-	-	-
7/1	34°25'	126°26'	Sauries	-	-	-	< 4 inches	-
			Squids	-	-	-	-	> 12 inches
7/5	36°37'	130°12'	Sauries	-	-	-	4-8 inches	-
7/6	37°19'	129°10'	Sauries	-	-	-	-	-
7/9	39°59'	126°51'	-	-	-	-	-	-
7/23	43°42'	127°53'	-	-	Sauries	-	-	-
7/28	38°45'	128°37'	Sauries	-	-	-	-	-
			Myctophids	-	-	-	-	-
7/29	39°00'	127°31'	Squids	-	-	Sauries	-	> 12 inches
			Myctophids	-	-	-	-	-
8/2	39°06'	127°31'	-	-	-	-	-	-
8/7	36°08'	123°29'	Sauries	-	-	-	-	-
			Myctophids	-	-	-	-	-
8/8	34°48'	123°22'	Sauries	-	-	-	-	-
			Squids	-	-	-	-	-

Table 14.--Night-light observations by the charter vessels

Date 1957	North latitude	West longitude	Sauries	Myctophids	Miscellaneous
Flicker					
7/22	42°20'	127°00'	Abundant	0	Ctenophora Pteropods
7/23	42°20'	128°45'	Abundant	0	Amphipods Salpa chains Pteropods
7/24	42°20'	130°45'	Abundant	20	2 salpa types 1 velella 1 invertebrate ?
7/26	42°00'	133°00'	Few	0	Weather rough
7/27	41°40'	131°40'	Few	1	-
7/28	41°30'	129°55'	Few	0	Salpa chains
7/29	41°32'	128°25'	Moderate	2	Salpa chains
7/30	41°40'	127°00'	Abundant	9	1 jellyfish
Roland R. Sr.			Luminescence		Bait
7/22	39°45'	124°40'	Very little		None
7/23	39°43'	127°50'	Very little		None
7/24	39°44'	129°20'	Very little		None
7/25	39°48'	131°00'	None		None
7/26	39°47'	132°20'	None		None
7/27	39°00'	131°48'	None		None
7/28	38°56'	130°51'	None		None
7/29	39°05'	129°13'	None		None
7/30	39°03'	127°41'	Small amount		None
7/31	39°05'	129°44'	None		None

Table 15.--Fish, bird flocks, and aquatic mammals sighted from the Hugh M. Smith (cruise 40)

Date 1957	Zone time[1/]	Noon position		Fish	Bird flocks	Aquatic mammals
		North latitude	West longitude			
7/4	1703	26°39'	152°42'	25 flying fish	-	-
	1730			-	-	1 whale
7/10	1229	42°20'	140°09'	1 sunfish	-	-
7/11	0700	44°39'	137°52'	-	Petrels (< 10)	-
	0805 through 1440			-	Many small unidentified birds	-
7/12	1143	44°02'	136°29'	-	-	5 porpoise
	1603			-	-	30 porpoise
7/16	1639	44°51'	130°01'	-	-	1 whale
7/18	0935	46°16'	124°16'	Medium-size, unidentified school	Petrels (11-50)	-
7/22	0911	46°59'	126°08'	-	-	2 porpoise
	1645			-	-	1 whale
	1655			1 great blue shark	-	-
7/23	0630	47°00'	127°47'	1 great blue shark	-	-
	1400			Albacore tuna school	-	-
7/24	1440	46°45'	130°14'	1 shark	-	-
	1647			Albacore tuna school	-	-
7/25	1115	46°46'	131°57'	-	-	1 seal
	1709			-	-	1 whale
7/26	1445	46°37'	133°04'	-	Snipes (?) (> 50)	-
	2010			-	-	1 seal
7/29	1535	44°25'	125°59'	-	-	1 whale
	1540			1 sunfish	-	-
	1550			-	-	4 whales
	1607			1 sunfish	-	-
	1730			Small-size school of anchovies (dead and floating)	-	-
	1835			1 sunfish	-	-
	1840			-	-	25 whales
	1945			-	-	6 porpoise
7/30	0635	43°22'	129°59'	-	-	3 whales
	0709			-	-	4 whales
	0810			1 great blue shark	-	-
	0853			1 great blue shark	-	-
				1 manta		

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 15.--Fish, bird flocks, and aquatic mammals sighted from the Hugh M. Smith (cruise 40) (cont'd)

Date 1957	Zone time[1]	Noon position		Fish	Bird flocks	Aquatic mammals
		North latitude	West longitude			
7/30	0910	43°22'	129°59'	-	-	Porpoise school
	0920			-	-	12 porpoise
	1720			-	-	35 porpoise
	1925			-	-	2 whales
8/1	0810	41°51'	131°04'	1 sunfish	-	-
	1925			1 sunfish	-	-
8/3	1720	41°05'	127°00'	1 great blue shark	-	-
	1735			-	-	2 whales
8/4	0635	40°44'	125°08'	1 sunfish	-	-
	0715			-	-	Porpoise school
	1128			-	-	6 porpoise
	1205			-	-	12 porpoise
	1247			-	-	1 porpoise
8/9	0835	39°10'	125°41'	1 great blue shark	-	-
	0845			-	Snipes (?) (11-50)	-
	0916			-	Snipes (?) (11-50)	-
8/11	0652	38°04'	127°41'	Large-size school of bait fish	-	-
8/13	1015	37°01'	127°38'	-	Snipes (?) (11-50)	-
	1638			-	-	1 whale
8/14	0655	36°58'	125°32'	1 great blue shark	-	-
8/26	1530	San Francisco		-	-	1 killer whale
8/27	0759	37°19'	123°07'	-	-	3 sperm whales
8/29	0700	32°14'	130°17'	-	-	2 sperm whales
	1125			-	-	6 porpoise
	1305			-	-	15 porpoise
8/30	1242	30°48'	134°09'	-	-	Large school of porpoise
	1642			-	-	2 whales
8/31	1617	29°16'	138°11'	Medium-size school of skipjack tuna	-	-
9/3	1635	24°43'	145°28'	-	-	1 sperm whale
9/4	0530	23°08'	153°12'	20 flying fish	-	-
	0600			50 flying fish	-	-
	1545			Small-size school of skipjack tuna	(11-50) petrels or shearwaters	-

[1] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 16.--Fish, bird flocks, and aquatic mammals sighted from the John R. Manning (cruise 36)

Date 1957	Zone time[1]	Noon position		Fish	Bird flocks	Aquatic mammals
		North latitude	West longitude			
6/12	0730	22°33'	156°45'	-	Terns (< 10)	-
	1215			1 flying fish	-	-
6/13	1250	24°42'	154°21'	1 flying fish	-	-
	1305			100 flying fish	-	-
6/14	1210	26°48'	152°14'	3 flying fish	-	-
6/17	0730	33°35'	145°19'	Medium-size school of large unidentified fish	-	-
	0845			-	-	1 sperm whale
6/20	1650	37°09'	141°15'	Small-size school of flying fish	-	-
6/21	0845	39°18'	138°39'	Large-size school of albacore tuna	-	-
	1110			Large-size school of albacore tuna, 15-20 pound fish	-	-
6/22	0835	40°09'	137°27'	-	Petrels (< 10)	-
	0930			-	Petrels (< 10)	-
	1005			-	Petrels (< 10)	-
6/23	1240	41°29'	135°05'	-	Petrels (< 10)	-
	1420			-	-	1 whale
7/1	1320	34°02'	127°12'	-	-	1 whale
	1625			1 flying fish	-	-
7/7	1310	37°32'	128°53'	-	Shearwaters (< 10)	-
7/12	1341	40°03'	133°03'	-	-	3 porpoise
7/13	1705	41°42'	130°22'	1 sunfish	-	-
7/14	1750	42°49'	128°26'	Albacore tuna school	Shearwaters (< 10)	-
7/15	1035	44°32'	126°28'	-	-	1 whale
	1645			1 shark	-	-
7/26	1645	40°47'	131°20'	1 shark	-	-
7/29	1230	38°56'	127°05'	-	-	8 whales
7/31	1205	38°59'	127°28'	2 sunfish	-	6 killer whales
8/3	1645	38°48'	127°09'	Large school of saury	-	-
	1740			-	-	1 whale
8/5	0930	38°05'	125°25'	-	-	1 humpback whale
	0935			1 sunfish 1 shark	-	-

[1] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 16.--Fish, bird flocks, and aquatic mammals sighted from the John R. Manning (cruise 36) (cont'd)

Date 1957	Zone time[1/]	Noon position		Fish	Bird flocks	Aquatic mammals
		North latitude	West longitude			
8/5	1200	38°05'	125°25'	School of bait	-	6 porpoise
	1242			Large school of bait	-	-
	1335			2 great blue shark	-	1 porpoise
	1419			-	-	4 porpoise
	1425			1 great blue shark	-	-
8/8	1305	35°44'	123°24'	-	-	1 seal
	1423			-	-	10 porpoise
8/9	0815	34°48'	123°54'	-	-	2 porpoise
8/10	1740	34°16'	126°21'	1 flying fish	-	-
8/15	0720	28°28'	142°56'	2 large schools of flying squid	-	-
	0800			Flying squid	-	-
	0820			Flying squid	-	-
	0905			Flying squid	-	-
	0935			Flying squid	-	-

[1/] Consult the Standard Time Chart of the World (HO 5192) of the U. S. Hydrographic Office for zone boundaries.

Table 17.--Fish, birds, and aquatic mammals sighted from charter vessels

Date 1957	Noon position		Daily summary of observations
	North latitude	West longitude	
			Lancing
7/22	45°03'	126°22'	A few birds
7/23	44°06'	128°18'	3 albatross
7/24	43°05'	129°05'	2 groups of unidentified fish or whales, 4 to 8 in each group
7/31	44°20'	126°13'	A few small birds, 1 whale
			Gypsy
7/27	43°28'	133°25'	Some feed and porpoise
7/29	42°56'	130°20'	2 albatross
7/30	43°02'	128°37'	2 albatross
7/31	42°56'	126°51'	Albatross
8/1	42°50'	125°36'	Several fish sighted
			Flicker
7/26	42°22'	132°34'	20 small sandpiper-like birds
7/27	41°40'	132°39'	2 small whales, 10 killer whales
7/28	41°36'	130°53'	6-foot great blue shark, bait breaking the surface
7/29	41°30'	129°13'	Medium-size sunfish
7/30	41°36'	127°45'	Small brownish to black whale
7/31	41°40'	126°18'	44 porpoise, 1 large whale
			Lynn Ann
7/22	41°00'	125°43'	1 albatross, 3 petrels, 2 whales, 3 unidentified birds
7/25	41°00'	130°17'	A few albatross and petrels
7/26	40°55'	131°26'	1 albatross, 2 petrels
7/27	41°00'	133°00'	2 albatross, 1 petrel
7/28	40°20'	131°54'	8 petrels, 1 shearwater, 2 albatross
7/29	40°20'	130°19'	3 killer whales, 1 petrel
7/30	41°26'	128°27'	12 petrels, 6 albatross, 4 unidentified birds, at one instance during the day 20 birds were sitting on the water
7/31	40°22'	126°42'	5 porpoise, 4 great blue sharks, 9 petrels, 1 shearwater, 35 unidentified birds
			Rowland R. Sr.
7/22	39°37'	125°35'	15 porpoise
7/25	40°00'	130°10'	1 petrel
7/26	39°43'	131°24'	Sauries jumping, 9 petrels, 2 albatross
7/27	39°20'	132°10'	7 petrels, 1 albatross
7/28	38°45'	131°57'	6 petrels, 1 albatross
7/29	39°00'	130°05'	7 albatross, 2 petrels
7/30	38°52'	128°25'	Small school of bait, 18 to 20 fish, 3 inches in length; sauries, 3 inches in length, 1 albatross, 1 petrel
7/31	38°55'	127°22'	1 petrel, 1 shearwater
			Allen Cody
7/24	38°18'	126°32'	Whales and sharks
7/31	37°35'	126°16'	Large school of whales, some small fish

Table 17.--Fish, birds, and aquatic mammals sighted from charter vessels (cont'd)

Date 1957	Noon position		Daily summary of observations
	North latitude	West longitude	
			Luwella
7/23	35°45'	123°37'	1 albatross
7/24	35°32'	124°39'	1 albatross
7/25	35°35'	125°14'	1 albatross, 1 petrel
7/27	35°45'	129°24'	2 albatross, 2 petrels
7/28	35°02'	128°25'	2 albatross, 1 shearwater
7/29	35°07'	126°47'	3 albatross, 1 petrel, 2 unidentified birds, 1 flying fish
7/30	34°52'	125°00'	2 albatross, 2 petrels, 1 tropic bird
7/31	34°55'	123°20'	Jumping sauries, 1 shark, 1 petrel, 1 unidentified bird
8/1	34°49'	121°48'	10 porpoise, 20 to 30 sunfish, 2 sharks, 2 petrels, 8 to 10 unidentified birds

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